

(19) World Intellectual Property Organization
International Bureau



(43) International Publication Date
4 October 2001 (04.10.2001)

(10) International Publication Number
PCT WO 01/74101 A1

(51) International Patent Classification⁷: H04Q 7/32,
7/22, 7/06

(21) International Application Number: PCT/FI01/00289

(22) International Filing Date: 23 March 2001 (23.03.2001)

(25) Filing Language: Finnish

(26) Publication Language: English

(30) Priority Data:
20000688 24 March 2000 (24.03.2000) FI
20002257 13 October 2000 (13.10.2000) FI

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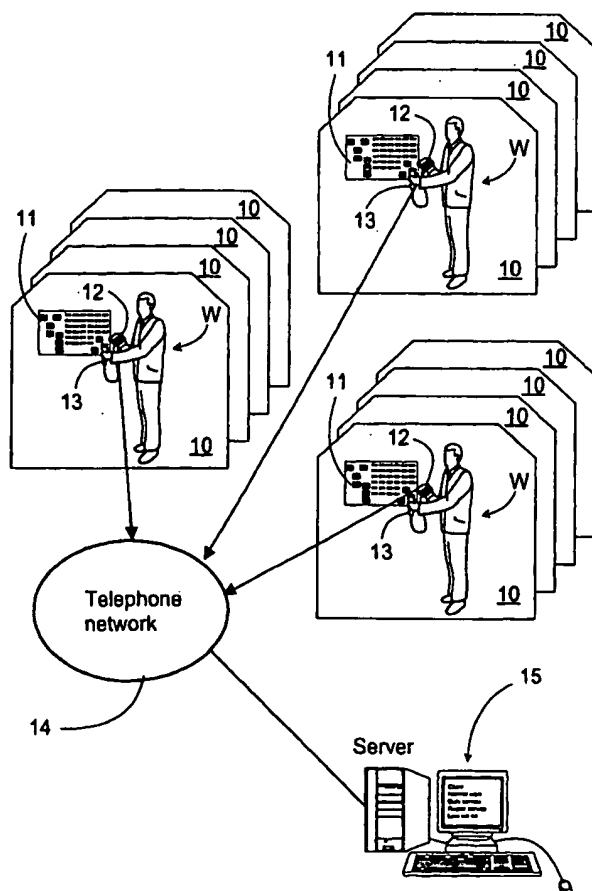
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(81) Designated States (*national*): AE, AG, AL, AM, AT, AT
(utility model), AU, AZ, BA, BB, BG, BR, BY, BZ, CA,
CH, CN, CO, CR, CU, CZ, CZ (utility model), DE, DE
(utility model), DK, DK (utility model), DM, DZ, EE, EE
(utility model), ES, FI, FI (utility model), GB, GD, GE, GH,
GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC,
LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW,
MX, MZ, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK,
SK (utility model), SL, TJ, TM, TR, TT, TZ, UA, UG, US,
UZ, VN, YU, ZA, ZW.

(84) Designated States (*regional*): ARIPO patent (GH, GM,
KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZW), Eurasian
patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European

[Continued on next page]

(54) Title: SYSTEM FOR LOCATING AN EMPLOYEE OR SIMILAR AND FOR SUPERVISING WORK



(57) Abstract: The invention relates to a system for locating a person (W) working at a number of remote work sites by turns and for supervising remote work, said system comprising at each work site (10) at least one bar code (111) for the identification of the site, permanent bar codes (112-118) for the indication of tasks and other information and at least one check code (119) to be replaced periodically, for each person (W), a portable mobile station (12) and a bar code reader (13) connectable thereto, a server (15) fitted to communicate with each mobile station via a telecommunication connection and to maintain a register of persons and a database of identifying codes for remote work places (10), an operating system for reading and transmitting the bar codes by means of a mobile station (12) to the server (15), comprising an application in the mobile station (12) and an application on the server (15).

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patent (AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE,
IT, LU, MC, NL, PT, SE, TR), OAPI patent (BF, BJ, CF,
CG, CI, CM, GA, GN, GW, ML, MR, NE, SN, TD, TG).

For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

Published:

— *with international search report*

SYSTEM FOR LOCATING AN EMPLOYEE OR SIMILAR AND FOR SUPERVISING WORK

The present invention relates to a system for locating a person working at a number of remote work sites by turns and for supervising remote work, said system comprising

- at each work site, at least one bar code used as an identifier for the identification of the site,
- for each person, a portable mobile station and a bar code reader connectable thereto,
- a server fitted to communicate with each mobile station via a telecommunication connection and to maintain a register of persons and a database of remote work place identifiers,
- an operating system for reading the bar codes and sending them by means of a mobile station to the server, comprising an application in the mobile station and an application on the server.

US patent specification 5,610,596 presents a system in which an industrial installation is supervised and monitored by using an arrangement in which each operator has telecommunication equipment and a reader for reading an electronic identifier which are used to confirm various things at the work sites. Instead of a bar code which can be photocopied, an electronic identifier is used, thus adding to the complexity of the system. An electronic identifier generally requires the use of a battery as a power source, which leads to an increased susceptibility to system failures.

The object of the invention is to achieve a simpler system for locating an employee or similar and for supervising work using a bar code technique and generally available equipment. The invention aims at eliminating the reliability problems associated with bar codes.

According to the invention, preferably the short message system (SMS) and preferably the GSM system are used. The bar code reader may be a commercial device which is connected to a known mobile telephone device having a data processing capability (e.g. Nokia Communicator).

In the following, the invention will be described by the aid of an example illustrated by the attached drawings.

10 Fig. 1 presents an overall view of a system according to the invention.

Fig. 2 presents a bar code table as used in the system of Fig. 1.

Fig. 3a and 3b illustrate routines used at the beginning and
15 end of a spell of work.

In the system of the example, the performance of persons W working at a plurality of work sites 10 by turns is supervised. Each person working in this manner has a mobile station 12 with a bar code reader 13 as a peripheral. In Fig. 1, these are interconnected via a connecting cable, but the connection can be easily implemented using a wireless link.

The person W starts a supervision application in his/her mobile station 12 and confirms the completion of different tasks by reading a corresponding bar code from a table 11 in a manner to be described hereinafter. At each work site, the employee's times of starting and finishing work as well as the tasks performed and other possible work information are
30 recorded in the mobile station 12, which sends the information via a telephone network 14 to a server 15. Using another application on the server, the movements of and tasks performed by different employees can be easily monitored. In addition, information can also be passed in the other direction, i.e. from the server 15 to the person's W mobile station 12.
35

Different work sites are provided with bar code tables as presented in Fig. 2, each table containing at least two changeable bar codes.

5 In a preferred case, both the client code 111 and the finish code 119 are replaceable codes in the form of stickers, but the other codes may be fixed codes printed on the table. There is generally no need to replace the sticker corresponding to the client code 111 after the table has been installed
10 at the work site 10, but a client code 111 identifying the work site is attached to the table to be taken to each work site. The sticker containing the finish code 119, however, is replaced at certain intervals, corresponding information being stored at the same time on the server 15, thus ensuring
15 that any attempt at using a copy will be detected.

The intelligent mobile station 12 of the invention is so programmed that the act of reading a bar code will trigger certain programmed actions. The bar code reader is e.g. model
20 TR14 manufactured by the Japanese Demson. Using a small level converter, the serial port of this device can be connected to the serial port of a mobile station (TTL-level RS232).

A wireless connection between the bar code reader and the
25 mobile station can be implemented e.g. using an infrared interface. The Bluetooth system will also be a natural alternative.

At a work site, the tasks completed are registered using a
30 supervision application as follows. The person W first reads the client code 111, whereupon a new work record is opened and the start time is recorded in memory. After this, the person may turn off the mobile station to execute the appropriate tasks and sales work.

In the example presented in Fig. 2, the execution of normal work and service are confirmed with separate codes, group 112, and washing service with code 114 and group 115 codes. Similarly, the execution of other tasks, such as tasks of
5 repair service, installation, restitution or planning work, is confirmed with separate codes, group 113 and the target is specified using the codes in group 116.

Having performed the maintenance operations or confirmed the
10 execution of sales actions, the person reads the finish code 119 and can then send the information to the server 15 by reading a send code, which will automatically activate a short message transmission (SMS) via the mobile station 12.

15 The application used in this example is implemented in the Nokia Communicator model 9110. This device uses the GEOS operating system by Geoworks Inc (USA), and the application has been created on a PC using the "GEOS SDK for Nokia 9110 Communicator" program. In this case, the application forms a
20 user interface, takes care of I/O traffic with the bar code reader, generates the short messages to be transmitted and finally gives the mobile station a send command for the transmission of each short message. The operator receives the short messages in a short message service center.

25

An agreement has been made with a telephone operator about the provision of a service whereby the short messages are sent to a selected IP address (IP = Internet Protocol) over the Internet information network. This IP address is the
30 aforesaid server, in which the short messages received are further distributed into a database by using a specific application. Such a service is provided e.g. by the Finnish operator SONERA under the designation "Content Gateway". This includes a software assembly to be installed on a server,
35 comprising programs which communicate with a short message

service center and, via an API interface, with a selected database (e.g. ORACLE).

In detail, the work process advances in accordance with the following scheme:

1. A bar code reader 13 is connected to the port of a mobile station 12 (Nokia 9110 Communicator).
- 10 2. The blue "Extras" key is pressed (starts the application menu).
3. From the list, the supervision application is selected with cursor keys and started by pressing the "Enter" or "Se-
15 lect" key.
4. Work is started by reading the Client code 111 from the code table 11, Fig. 3a. Once the code has been read, the work start time ("WORK START TIME") is displayed. The software can
20 be left in this state by disconnecting the bar code reader 13 from the mobile station. All other applications in the telephone can be used in the normal way even if the supervision application is running. After the required work at the restaurant has been finished, the reader 13 is again connected
25 to the mobile station 13 to allow the work done to be read.
5. The hours of work ("WORKING HOURS") are read after the Client code 111 by means of group 112. For normal working hours, the Normal Work code is read, whereupon the screen
30 will display "N" in the "WORKING HOURS" field. For duty service working hours, the Service code is read, whereupon the screen will display "I".
6. In the Tasks (TASKS) position, groups 114 and 113, the
35 tasks performed in the restaurant are read. For example, if the employee has washed lines 1 - 5 of the restaurant, then

the Washing Service code 114 is read first. The screen displays the letter "P" in the "TASKS" field. After this, the codes (group 115) of the lines washed are read.

5 The screen displays: "TASKS:P0102030405".

If a failure has been fixed at the same time, then the employee will first read the Repair Service code, whereupon the screen will display "V", and then the "Failure" code in question, e.g. "Beer 41".

The screen displays: "TASKS:P0102030405V41".

7. The number of kilometers driven by the employee is input
15 in the "KILOMETERS" field by using the number keys of the keyboard. (If no driving was involved, then the employee will key in the number "0").

8. Once the work has been finished, the employee will read
20 the Finish code 119 from the bar code chart, Fig. 3b. After this, the employee can either send the information or make a correction if any data has been incorrectly read. If the employee chooses Correct 118, then all the data will have to be input again starting from "WORKING HOURS".

25

9. If the employee chooses Send 117, then the mobile station 112 will transmit the information further in the form of a short message.

30 10. If the employee makes a mistake, then the program (user interface) will automatically display instructions in an information field to guide the employee.

To prevent malpractice, as stated above, both the client code
35 111 and the corresponding Finish code 119 are printed on readily replaceable stickers, allowing possible malpractice

to be detected on the basis of an incorrect finish code. Otherwise the table may be made of a rigid plastic material with all the other codes permanently printed on it. Such a table is fixedly mounted on a wall, so that it will be difficult to
5 copy while still permitting easy reading of the bar codes.

According to a preferred embodiment, a qualifier to be added to the finish code is calculated using a selected formula, in which case the data contained in the bar code will not be
10 transmitted directly as such. A formula like this is based on taking the two last digits of the client number, in this case "59", and generating from this together with a selected fixed number, e.g. "9" a XOR function (by a binary method), which yields as a result a check value, in this case "50", which is
15 required to be the same as the finish code (or its beginning) in the table or only in server memory. Thus, the Finish code to be sent would be e.g. "L501", where the last digit indicates e.g. the software version. If desired, the application can also give an "Incorrect Finish code" notice to the person
20 using the device. This arrangement ensures that the confirmation of execution of a task always has to be given at the same work place where the client code was read. By periodically replacing e.g. the finish code sticker with a sticker in which at least one digit is changed, the use of an old
25 copied sticker is prevented. The check code, in this case the finish code, is not associated with a plain description of its content as the other codes in the table are. The content of a changed finish code sticker is updated on the server, so the application running on the server can detect any attempt
30 at using an old finish code.

It is also possible to use some other method for computing the code so that there is no apparent connection between the client code and the check value to be transmitted. The appli-
35 cation can naturally be implemented in a mobile station of some other type or in a mobile station provided with a new

operating system (e.g. Symbian). Instead of short messages (SMS), it is possible to use any mobile communication data service that can be controlled by a user application in a mobile station. Such services include present DATA calls and 5 WAP services. In the future, corresponding data services will be provided over UMTS networks.

CLAIMS

1. System for locating a person (W) working at a number of remote work sites by turns and for supervising remote work, said system comprising at each work site (10) at least one bar code (111) for the identification of the site,
- for each person (W), a portable mobile station (12) and a bar code reader (13) connectable thereto,
 - a server (15) installed to communicate with each mobile station via a telecommunication connection and to maintain a register of persons and a database of identifying codes for remote work places (10),
 - an operating system for reading and transmitting the bar codes by means of a mobile station (12) to the server (15), comprising an application in the mobile station (12) and an application on the server (15),
- characterized in that each remote work site (10) is provided with permanent bar code identifiers (112 - 118) for the indication of tasks and other information and with at least one check code (119) to be replaced periodically.
2. System as defined in claim 1, characterized in that, in addition to the remote work site code (111), each remote work site (10) is provided with a check code to be replaced periodically, the content read from said check code being fitted to be converted by a selected formula and transmitted as a check value, the server being fitted to check the received check value.
3. System as defined in claim 1 or 2, characterized in that the bar code reader (13) and the mobile station (12) are provided with means whereby a bar code that has been read is transmitted to the mobile station by a wireless technique.

4. System as defined in claim 1 or 2, characterized in that the application in the mobile station (12) contains at least the following functions registered by means of bar codes at each remote work site:

- 5 - start of work for recording the start time and the work place,
- specification and recording of tasks and/or work places,
- termination of work for recording the finish time,
- 10 - assembly of the recorded information into a file to be transmitted.

5. System as defined in claim 4, characterized in that the transmission of the assembled file to the server (15) has
15 been arranged to be started automatically upon the reading of a special "Send" bar code (117).

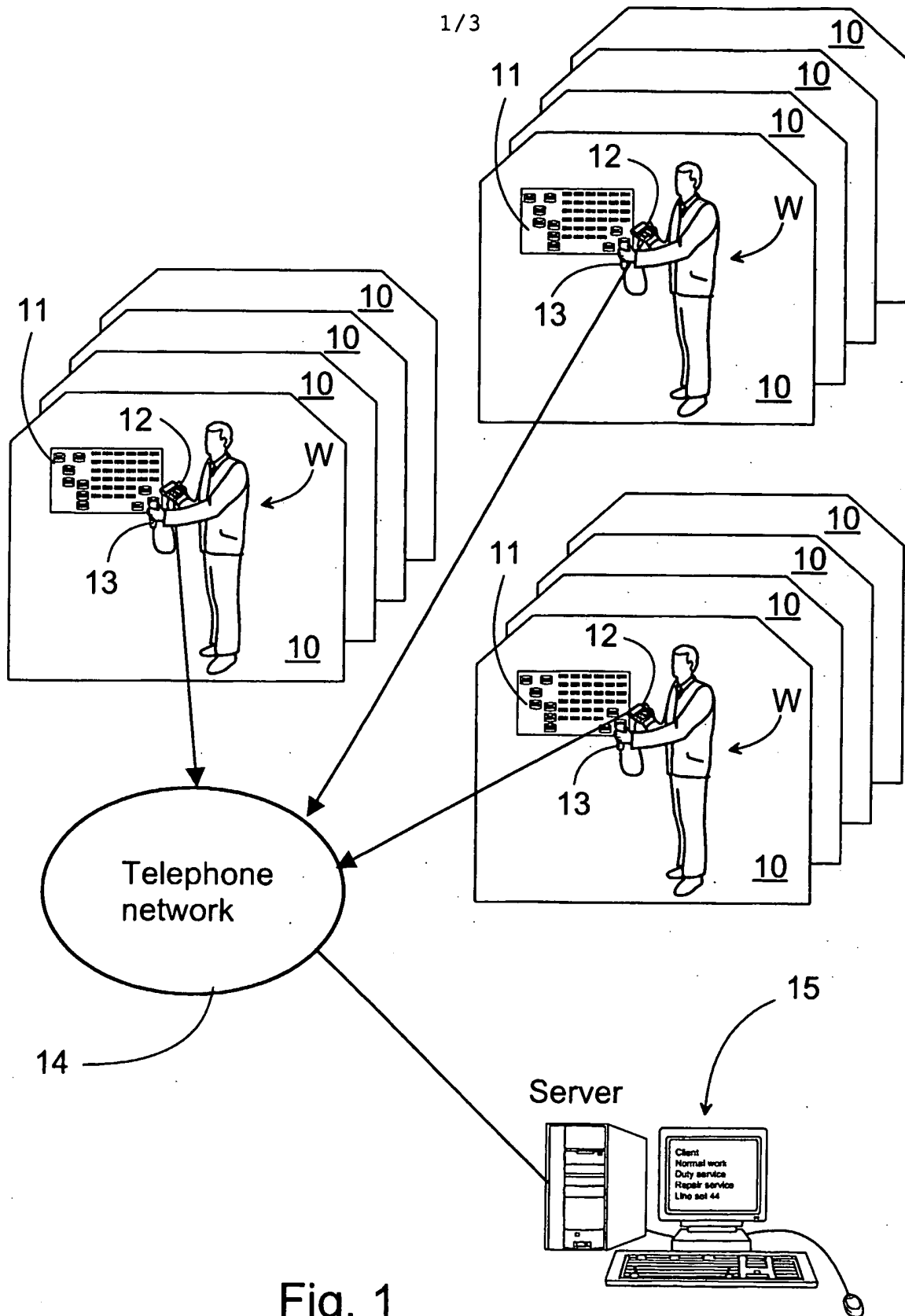
6. System as defined in claim 4 or 5, characterized in that the application in the mobile station (12) contains a sub-
20 application for the input of information in the form of text.

7. System as defined in any one of claims 1 - 6, character-
ized in that the bar codes for the remote work site (10) have been collected into a table (11) to be mounted on a wall or
25 equivalent, in which table the replaceable bar codes (111, 119) are stickers.

8. System as defined in any one of claims 1 - 6, character-
ized in that the application in the mobile station (12) con-
30 tains an arrangement for the registration of an employee (W).

9. System as defined in any one of claims 1 - 8, character-
ized in that the data transfer between the mobile station and the server (15) is implemented using a short message system
35 (SMS = short message services) known in itself.

10. System as defined in claim 9, characterized in that the system comprises a short message service center fitted to send the short messages to a selected IP address in the Internet information network, said IP address being set in
s the server.



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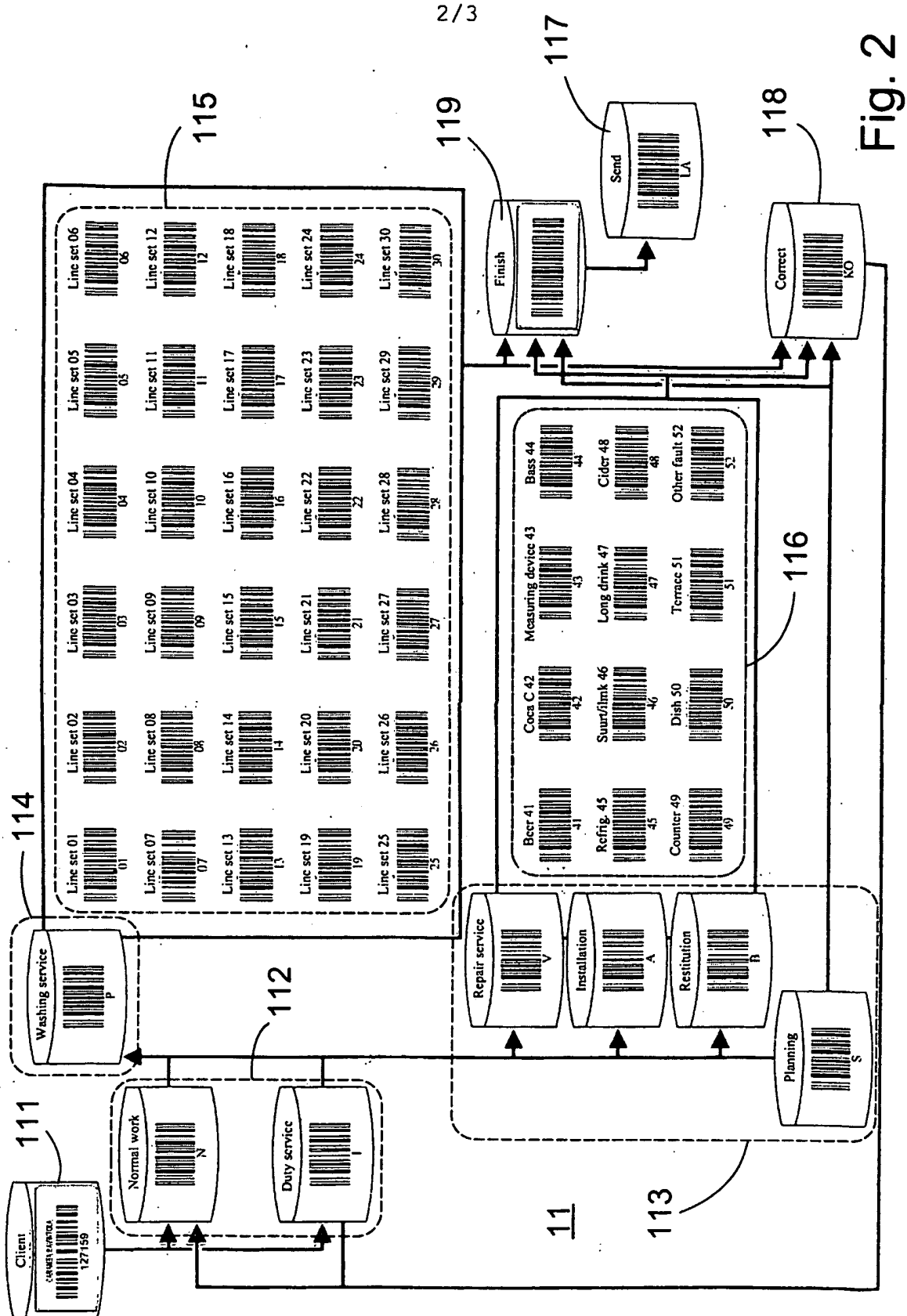


Fig. 2

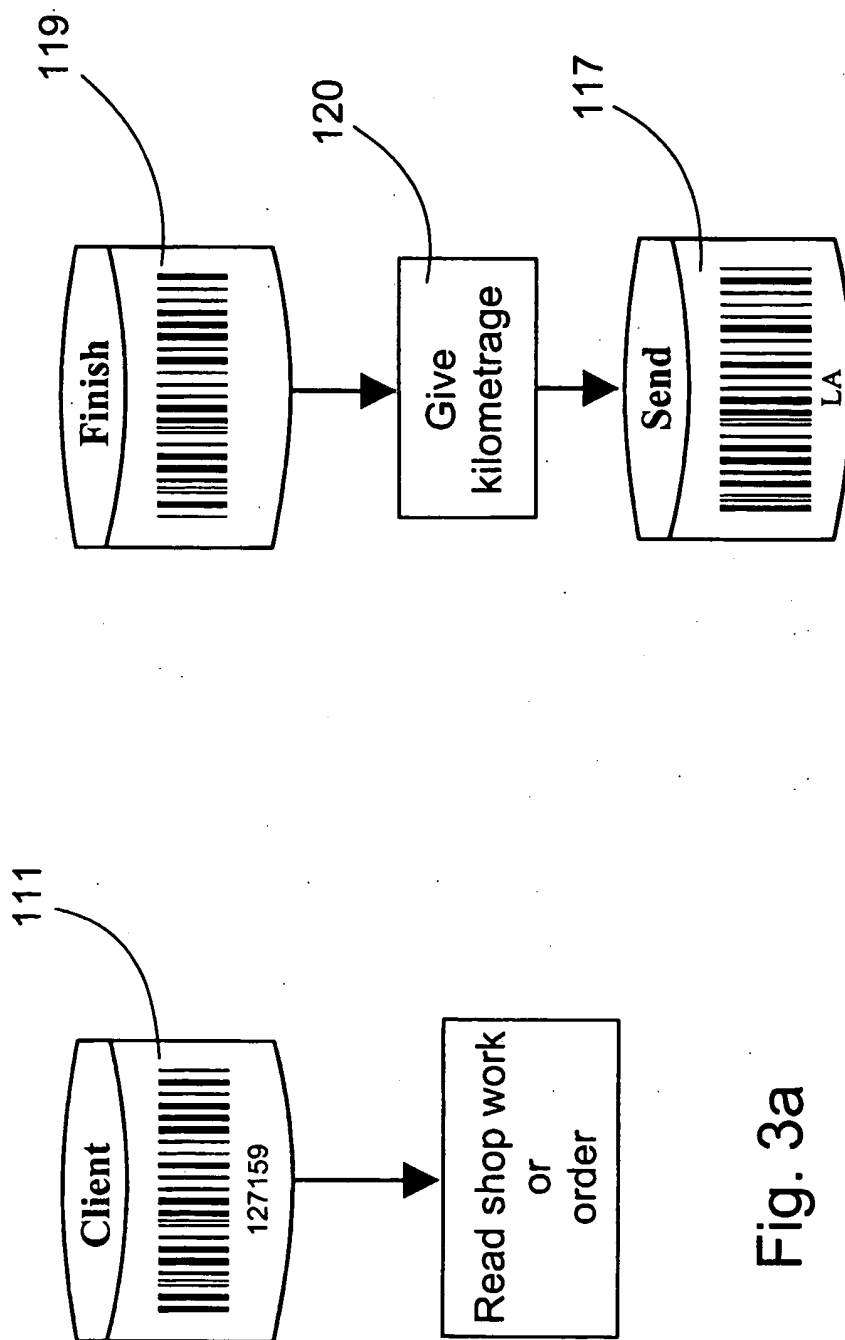


Fig. 3a

Fig. 3b

INTERNATIONAL SEARCH REPORT

International application No.

PCT/FI 01/00289

A. CLASSIFICATION OF SUBJECT MATTER

IPC7: H04Q 7/32, H04Q 7/22, H04Q 7/06

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC7: H04Q

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

SE,DK,FI,NO classes as above

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	US 5298725 A (FISCHER), 29 March 1994 (29.03.94), column 2, line 35 - line 45; column 3, line 1 - line 13; column 3, line 45 - line 65, col 4 line 1-10, col 4 line 40-65, fig 3,4,5,7, claims 1,5, abstract --	1-10
Y	EP 0848564 A2 (ROBERT BOSCH GMBH), 17 June 1998 (17.06.98), column 1, line 45 - line 58; column 2, line 24 - line 57; column 4, line 5 - line 15, figures 1,2, abstract -- -----	1-10

☐ Further documents are listed in the continuation of Box C.☒ See patent family annex.

* Special categories of cited documents:

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Date of the actual completion of the international search

27 June 2001

Date of mailing of the international search report

04 -07- 2001

Name and mailing address of the ISA/
Swedish Patent Office
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INTERNATIONAL SEARCH REPORT

Information on patent family members

28/05/01

International application No.

PCT/FI 01/00289

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
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US 5298725 A 29/03/94 NONE

EP 0848564 A2 17/06/98 DE 19651453 A 18/06/98
JP 10191440 A 21/07/98
